nanotube on top of it, the axis of said nanotube being essentially normal to one the edges of the said conductive layer and protrudes beyond said one of the edges of conductive layer; the second electrode includes a conductive layer placed on the substrate next to said one of the edges of said first conductive layer and on a plane below the plane of said first electrode, so that said nanotube is located above and protrudes into the area of said second electrode.

2. The diode of claim 1 placed into a vacuum chamber.
3. The diode of claim 2 wherein said vacuum chamber is filled with an inert gas.
4. The diode of claim 1 wherein said nanotube is a single walled nanotube.
5. The diode of claim 1 wherein said nanotube is a metal type nanotube.
6. The diode of claim 1 wherein said nanotube is a metal type and a single walled nanotube.
7. The diode of claim 1 wherein an additional metal layer is disposed on top of a major part of said nanotube leaving exposed the nanotube tip protruded into the area of said second electrode.
8. The diode of claim of 7 wherein said additional metal layer is disposed onto entire nanotube including the nanotube tip.
9. The diode of claim 8 wherein said additional metal layer is made from a material with a low work function for electron emission into vacuum.
10. The diode of claim of 9 in which said additional metal layer is made from Cs.
11. A method of fabrication of the diode of claim 1 consisting of the following steps:
    providing a non conductive substrate;
    deposition of a dielectric layer on the substrate;
    deposition of said conductive layer for said first electrode;
    photolithography patterning and etching of both said conductive layer and said dielectric layer to form said first electrode on said dielectric layer;
    using the same photolithography pattern, self-aligned deposition of the conductive layer of said second electrode; photoresist lift off.
    second photolithography patterning and etching to define the second electrode;
    removal of the photoresist.

placement of said nanotube on the surface of said conductive layer of said first electrode.

12. The method of fabrication of the diode of claim 11, wherein an additional conductive layer is disposed on top of said first electrode to cover a major part of said nanotube leaving exposed only the nanotube tip protruded into the area of said second electrode.
13. The diode of claim 1 wherein more than one nanotube is placed on said first electrode, positioned normally to said one of the edges of said conductive layer of the first electrode and protruded into the area of said second electrode.
14. A diode comprising two electrodes laterally shifted from each other and placed on an insulating substrate; the first electrode contains the first conducting layer; the second electrode contains the second conductive layer disposed next to one of the edges of said first conductive layer on a plane below the plane of said first conductive layer; a small pad of nanotube catalytic material is deposited on said second conductive layer in close proximity to said one of the edges of said first conductive layer, and the nanotube is grown normally to the substrate plane; the nanotube height is such that the nanotube tip is slightly below or reaches the plane of said first conductive layer.
15. The diode of claim 14, in which said small pad of catalytic material is made from transition metals Fe, Ni or Co.
16. The diode of claim 14, wherein an array of small pads of catalytic material are deposited on said second conductive layer along said one of the edges of said first conductive layer and thus create, after the nanotube growth, an array of the nanotube electron sources.
17. The diode of claim 16, wherein said small pads of catalytic material are of the size less then micron and thickness of a few hundreds of nm to grow a single walled nanotube on each pad.
18. The method of fabrication of the diode of claim 16, which consists of the following steps:

    providing the insulating substrate;

    deposition of a dielectric layer on the substrate;

deposition of the first conductive layer on the substrate for the first electrode;
first photolithography patterning and etching of said first conductive layer to form said first electrode;
using the first photoresist pattern, etching of said dielectric layer to provide the plane for the second electrode;
using the same photoresist pattern, self-aligned deposition of the second conductive layer for the second electrode;
using the same photoresist pattern, self-aligned deposition of a catalytic metal on said second conductive layer; photoresist lift off;
second photolithography patterning for e-beam processing on the surface of the catalytic layer to form small pads of the catalytic material in close proximity to one of the edges of said first conductive layer;
selective etching of said pads of catalytic material to further reduce their size;
third photolithography patterning; etching of said second conductive layer to outline the second electrode area; removal of the photoresist;
growth of the nanotubes on said small pads of catalytic material.

19. The diode of claim of 14 wherein said additional metal layer is disposed onto the tip of nanotube.
20. The diode of claim 19 wherein said additional metal layer is made from a material with a low work function for electron emission into vacuum.
21. The diode of claim of 20 in which said additional metal layer is made from Cs.
22. A triode, comprised of the following elements:
a nanotube placed on the insulating substrate and having two metal contacts on top of it; first contact is placed at the end of the nanotube, while the second contact is placed essentially in the middle of the nanotube, on top of the insulating layer preliminary disposed on the nanotube; both said metal contacts are connected respectively to the first and second electrodes; the third electrode is placed next to the second electrode, on the plane below the plane of said second electrode; the nanotube is placed in the direction normal to the edge of the first electrode neighboring the second electrode; one of the tips of the nanotube is left exposed and protrudes into the area of the third electrode.

23. The triode of claim 22 in which the nanotube is semi-conducting.
24. The triode of claim 22 in which the nanotube is single walled.
25. The triode of claim 22 in which the nanotube is single walled and semi-conducting.
26. The triode of claim 22 in which an array of parallel nanotubes is placed on said insulating substrate, so that all the nanotubes are oriented normal to said edge of the first electrode and have tips exposed and protruded into the area of said third electrode.
27. A triode comprised of the following components:
first, second and third electrodes placed on the insulating substrate, said first, second and third electrodes having respectively first, second and third conductive layers; said first conducting layer is disposed on the dielectric layer preliminary deposited on the substrate; said second and third electrodes are placed on the substrate, with the second electrode being placed next to one of the edges of said first conducting layer, while the third electrode is placed some distance away from said second electrode; a nanotube is placed on said first conducting layer in the direction essentially normal to said one of the edges of said first conducting layer, with nanotube tip protruding into the area of said second electrode.
28. The triode of claim 27, wherein the nanotube is a single walled nanotube.
29. The triode of claim 27, wherein the nanotube is a metal type nanotube.
30. The triode of claim 27, wherein the nanotube is single walled and metal nanotube.
31. The triode of claim 27 wherein an array of nanotubes is placed on said first electrode, with the nanotubes oriented normal to said one of the edges of said first conductive layer with their exposed tips protruding into the area of said second electrode.
32. The triode of claim 27 in which an additional conducting layer is deposited on the first electrode on the part of the nanotube, leaving exposed the nanotube tip protruding into the area of said second electrode.
33. The triode of claim 27 wherein said additional metal layer is disposed onto entire nanotube including the tip of nanotube.

34. The diode of claim 27 wherein said additional metal layer is made from a material with a low work function for electron emission into vacuum.
35. The diode of claim of 27 in which said additional metal layer is made from Cs.
36. The method of fabrication of the triode of claim 27 consisting of the following steps:

    providing a non conductive substrate;

    deposition of the dielectric layer;

    deposition of the first conductive layer of said first electrode;

    photolithography patterning and etching of said conductive layer to form said first electrode;

    using the same photolithography pattern, etching of the dielectric layer to provide the plane for said second electrode;

    using the same photolithography pattern, self-aligned deposition of the conductive layer of said second and third electrodes; photoresist lift off;

    second photolithography patterning and etching to define said second and third electrodes; photoresist removal;

    placement of the nanotube on the surface of said conductive layer of said first electrode.
37. The method of claim 36, wherein after placement of the nanotube, additional photolithography patterning is made followed by metal deposition, to place a metal contact on top of the nanotube while leaving exposed the nanotube tip protruding into the area of the second electrode.
38. A triode comprising three electrodes laterally shifted from each other and placed on an insulating substrate; the first, second and third electrodes contain respectively first, second and third conducting layers; said first and third conductive layers are deposited on the dielectric film preliminary deposited on the substrate surface; said second conductive layer is disposed on the substrate next to one of the edges of said first conductive layer, while said third conductive layer is placed away from the second electrode; a small pad of nanotube catalytic material is deposited on said second conductive layer in close proximity to said one of the edges of said first conductive layer, and the nanotube is grown normally to the

substrate plane; the nanotube height is such that the nanotube tip is slightly below or reaches the plane of said first conductive layer.

39. The triode of claim 38, wherein an array of the nanotubes is grown normally to the substrate plane in close proximity to said one of the edges of said first conductive layer.
40. The triode of claim 38 wherein the nanotube is single walled.
41. The triode of claim 38 wherein the nanotube is a metal type nanotube.
42. The triode of claim 38 wherein the nanotube is metal type and single walled.
43. The triode of claim of 38 wherein said additional metal layer is disposed onto the entire nanotube including the tip of nanotube.
44. The triode of claim 43 wherein said additional metal layer is made from a material with a low work function for electron emission into vacuum.
45. The diode of claim 44 in which said additional metal layer is made from Cs.
46. A ballistic triode, comprised of:

    two conductive electrodes deposited at the ends of said nanotube, the nanotube being placed on a non conductive substrate; said two conductive electrodes leave exposed at least one nanotube tip;

    the third conductive electrode is placed on the substrate next to said exposed at least one nanotube tip and on a plane below the plane of said two conductive electrodes, so that said nanotube is located above said third conductive electrode, and said nanotube tip protrudes into the area of said third conductive electrode.
47. The ballistic electron source of claim 46, wherein said nanotube is a semiconductor type nanotube.
48. The ballistic electron source of claim 46, wherein said nanotube is single walled.
49. The ballistic electron source of claim 46, wherein said nanotube is single walled and semiconductor type.